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1.A CROP SURVEY AND CLASSIFICATION

Identification of Crop Species by Computer Processing of ERTS-1 MSS Data

ERTS Frame No. E-1017-16093; August 9, 1972

Introduction

Classification of ERTS MSS data for crop identification with quantitative evaluation of the classification accuracy have been accomplished.

The area classified includes three counties in northern Illinois—Dekalb, Lee, and Ogle. These counties have highly productive soils and are intensively cropped. Ground truth to support the analysis consisted of identification of the crop or use of over 500 fields. A small number of these fields were used for training the maximum likelihood classifier and the remainder were used for testing the accuracy of the classifier.

Procedures

Ground truth data was recorded on large scale aerial photo-graphy. Boundaries of individual fields were then drawn onto gray-scale computer printouts. These printouts showing eight spectral classes were generated using statistics from NSCLAS, a non-supervised classifier (i.e. clustering algorithm). The coordinates of rectangular areas within the fields were then obtained. These fields were then used for training and testing the maximum likelihood classifier. Bands 4 and 5 (.5-.6 and .6-.7) were used in the classification.

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Results

The first quantitative evaluation of crop species identification showed accurate identification of corn, söybeans, and "other" over a three county area in northern Illinois. Overall classification performances of 80 percent or greater were obtained for the several tests conducted. Training sets selected from areas 15 to 25 miles away from the area being classified could be used satisfactorily. Training sets with as few as three fields each of corn and soybeans gave as accurate performances as six and nine fields and nearly as accurate as for 12.

The results demonstrate the potential use of ERTS data in making crop acreage estimates over large geographic areas.